Newsletter
Biophysical Society JULY 2017

Cell Biophysics Subgroup Petition Circulating

To sign the petition email subgroups@biophysics.org

See Page 20

DEADLINES

BPS Congressional District Visits Program

July 21, 2017
Registration Deadline

International Relations Committee Meeting Support

August 15, 2017
Grant Applicaiton Deadline

62nd BPS Annual Meeting

February 17-21, 2018

October 2, 2017
Abstract Submission

Congressional Fellow

December 15, 2017
Applicaiton Deadline

Jennifer Doudna Named 2018 National Lecturer

Jennifer Doudna

Jennifer Doudna, University of California, Berkeley, HHMI, has been selected to present the 2018 National Lecture at the Biophysical Society 62nd Annual Meeting in San Francisco, California. The lecture, *CRISPR Systems: Biology and Application of Gene Editing*, will take place on Monday, February 19, 2018.

Yasmeen Hussain to Serve as 2017–2018 BPS Congressional Fellow

The Biophysical Society is pleased to announce that BPS member *Yasmeen Hussain* will be the Society's third Congressional Fellow, beginning September 1, 2017. Hussain received her PhD from the University of Washington in biology. Since graduation, she has worked at the National Academy of Sciences, first as a Christine Mirzayan Science and Technology Policy Fellow and then as an associate program officer. Her work at the Academy has focused on higher education issues.

Hussain started learning about science policy during graduate school. "The more I learned, the more I wanted to jump into that field and experience it firsthand," notes Hussain. "My activities in science communication, service, and leadership convinced me that I wanted to look beyond the bench and use my scientific training in a different role. The Biophysical Society Congressional Fellowship was the chance I was looking for: the opportunity to serve as a science resource for our nation's policymakers and make an impact in federal decision-making."

Yasmeen Hussain

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Biophysical Society

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President's Message

Lukas Tamm

One of the functions of a membership society is to advocate for its members, the field they represent, and the jobs they do. The Biophysical Society has for years conducted a robust public policy and advocacy effort on behalf of its members. We bring Society members to Capitol Hill several times each year to speak to their members of Congress about the impact of their research and the economic impact that government funding of research has on local economies. Before leaving these meetings, we always offer to serve as resources for questions they may have in the future about science and science funding. The Society has also worked with coalitions in spreading a consistent, positive message about the importance and impact of scientific research to health and the economy. These efforts have helped develop support for scientific research from both Republicans and Democrats, maintaining a strong scientific endeavor through administrations from both parties. It is through these efforts that support for government-funded science has been a non-partisan issue for a very long time.

That is not to say that science has always received the level of funding it advocated for, but science has garnered respect and support across the aisle, and has often seen Congress provide higher levels of funding than the President's budget had requested. The current funding cycle is no different. *President Trump's* proposed budget for 2018 includes dramatic cuts to the funding of scientific research, including a 20% cut to the National Institutes of Health budget and an 11% cut for the National Science Foundation. While some governments around the world are increasing their funding for science, many others, from Australia to Denmark to Brazil, are making cuts as well. The funding issue affects all members of the Biophysical Society.

> "Now is the time for you, BPS members, to engage with your local elected officials who need and want to hear from you."

While the Society will continue its advocacy efforts, now is the time for you, BPS members, to engage with your local elected officials who need and want to hear from you. You can do this no matter what country you are in. Many leaders do not see how funding of scientific research benefits their local areas and this is where you, their constituents, can and should make a difference. They need to see and understand that cuts affect people they represent and work that takes place in their districts; cuts are not abstract budget savings but loss of funding that stops important research, eliminates jobs in the public and private sector, and stalls economic drivers.

In the United States, Congress takes a month-long break each August. For those of you living and working in the United States, this is a great time to go and meet with your members of Congress in their home office or invite them to visit your research lab. And to make it easier for you, the BPS Public Affairs Committee is leading an initiative to assist you with setting up and preparing for these meetings. To take advantage of this help, all you need to do is sign up to participate on the Biophysical Society website www.biophysics.org/policy/policyadvocacytoolkit. Sign up today and become a voice for science!

—*Lukas Tamm*, Biophysical Society President

Greetings from your new BJ Editor-in-Chief

In my first editorial as editor-in-chief of *Biophysical Journal*, I want to emphasize the outstanding work our BJ team has done, and will continue to do, in producing a truly impactful scientific publication in which each issue contains a wealth of cutting-edge biophysics. I also wish to sing the praises of our outgoing Editor-in-Chief, *Leslie* (*Les*) *M. Loew*, who has done an amazing job implementing new initiatives, while constantly working to improve the quality and visibility of the journal and its component articles. He has been a wonderful mentor as I have prepared during the last 12 months to take on this job. We all owe Les a debt of gratitude for his dedication to the journal, and I know he will continue to promote and publish in BJ going forward.

A high-quality journal should publish the best science. That means two things: first, the journal must attract excellent submissions; second, it must rigorously select the best submissions for publication. The first requirement depends on the journal's reputation, which in turn depends on a number of factors: the reputation of the editor-in-chief and editorial board members, quality and fairness of review, turnaround time, editing quality, cost (page charges, color figures, etc.), and the perceived impact factor of the journal. An author's decision to submit to a particular journal depends on these factors, as well as whether the journal publishes articles on subjects similar to that of the prospective submission, and a perception that the technical content of the manuscript is at a suitable level for the journal.

Rigorous selection for quality depends on the editorial board of the journal and ultimately on the Editor-in-Chief. The Editor-in-Chief and the Associate Editors work together to create the culture of excellence and fairness that is a prerequisite for any successful journal. They recruit Editorial Board members, who are ratified by the Publications Committee. The Editorial Board is dynamic: the members' terms are short (three years; renewable once) to ensure turnover. However, constant turnover means we must work constantly to integrate Editorial Board members into the journal's culture. Our current Editorial Board has 135 members: Is that the right size? Is there representation where there should be? Is it too large to ensure overall uniform high quality? This is something that will be evaluated on an ongoing basis.

BJ has recently instituted sliding scales for reviewers to evaluate important criteria, and I believe this will add greatly to the review and evaluation process by focusing the attention of reviewers on issues that need to be addressed in the review. We also need to look at review turnaround times and what we can do to make our reviewers' job easier, and give them recognition for quality, timely reviews.

Jane Dyson

BJ remains on a very solid basis as a Society-owned journal with an excellent reputation. BJ has continuously innovated to maintain and enhance efficiency, visibility, and relevance. The Society's involvement is clearly a great strength, as evidenced by the special issues based on Biophysical Society Thematic Meetings.

What more can we do? BJ is a Society journal, and we firmly believe that BJ serves the membership best by focusing on being the top journal in the field, the premier general biophysics journal that publishes the best biophysical research. To this end, we will continue to make use of new technologies and social media platforms. *Les Loew* has worked tirelessly to increase the journal's presence in social media. This will be continued and amplified. We will develop interactive content on the BJ website and social media accounts. We will also expand the "Computational Tools" section to include "New Experimental Tools," to showcase innovations in experimental biophysical methodology and, more generally, emphasize that biophysics is an evolving discipline and that BJ is an important catalyst in this development. The unabashed goal is the make the journal even more attractive as a venue for publishing the best research, such that BPS members look forward to publish their cutting-edge work in BJ.

There is much to do, and I very much look forward to working with each of you, authors, reviewers, Associate Editors, and the members of the Editorial Board. Together we will strengthen the journal further by promoting the tradition of scientific excellence that has been the hallmark of *Biophysical Journal*.

—*Jane Dyson*, BJ Editor-in-Chief
Reprinted from Biophysical Journal 113(1)

Biophysicist in Profile

JAMAINE DAVIS

Jamaine Davis

"My favorite subject in high school was physics," shares *Jamaine Davis*, assistant professor of biochemistry and cancer biology at Meharry Medical College. "One day my physics teacher Mr. *Jensky* pulled me to the side and told me he entered me and another student into a regional competition to see whose small car or device would travel furthest using a mouse trap [for propulsion]. While difficult to comprehend at first, it fascinated me to witness all the ingenuity of the students from around Long Island."

Davis naturally excelled in math and science as a student, which led him to major in chemical engineering as an undergraduate at Drexel University. At the time, most chemical engineers ended up working in chemical processing plants, but Davis decided that he wanted to integrate biomedical research into his training. "Luckily, within my network of friends, I found a position as a lab technician working with Dr. *Jacqueline Tanaka* who studies photoreceptor channel activation by cyclic nucleotides. This led me to take a position as a research technician and explore the fascinating field of biophysics," he says. "Once I witnessed the dynamics of a research career — and especially an academic career — I knew it was what I wanted to pursue." After working as a lab technician for a few years, and with Tanaka's encouragement, he decided to pursue a doctoral degree.

He graduated from the University of Pennsylvania with a PhD in biochemistry and molecular biophysics in 2007. "Studying proteins and enzymes in graduate school made me curious to understand how protein structure relates to function. Therefore, I decided to become trained in X-ray crystallography and joined the Macromolecular Crystallography Lab at the National Cancer Institute in Frederick, Maryland, working with Dr. *Alex Wlodawer*," Davis says.

Following his postdoctoral appointment, he began his faculty position at Meharry Medical College. "I noticed rather quickly that clinical and translational researchers — and even cell biologists — speak a completely different language from structural biologists. This seemed rather odd since both fields ultimately want the same thing: [to] identify new drugs to understand how they work and help save lives," he says. "This made me focus on how a protein crystallographer can bridge this gap and so I am part of an emerging field of personalized structural biology. Medicine is rapidly advancing toward treating the individual patient and not the general disease. The integration of structural biophysics with protein dynamics and translational medicine will advance understanding of the energetics and kinetics of molecular interaction between drugs and biomolecular targets."

This interdisciplinary approach to medicine requires an understanding of the genetic background of each patient in order to prescribe the right drug for the right person. Understanding this led Davis to explore how his research, with his background in enzymology, protein chemistry, structural and cellular biology, could fit into the realm of personalized medicine. "At Meharry Medical College we seek to improve the health and healthcare of minority and underserved communities, and therefore aspects of my research explore observable biological differences among racial and ethnic groups in tumors," he explains. "I am also a member of the Center for Structural Biology at Vanderbilt University. Vanderbilt is one of the few research institutions with a dedicated focus on personalized structural biology. Therefore, my research program has evolved to incorporate the strengths of both institutions." Specifically, the projects in Davis's laboratory investigate structural mechanisms of genome maintenance in chemoresistant cancers, with the goal of defining novel targets for anti-cancer therapies.

"We both have a keen interest in the emerging area of personalized biochemistry and biophysics. Jamaine is especially interested in BRCA1 gene variations, associated molecular disease mechanisms, and why they disproportionately impact women of African descent," shares *Chuck Sanders*, associate dean for research in the basic sciences and professor of biochemistry at Vanderbilt and Davis's friend and mentor. "Jamaine brings to the table a great vision for conducting biochemistry and biophysics with a keen eye on the long-term benefits to society that result from research progress. He is fearless when it comes to learning how to adapt new approaches to old problems."

The biggest challenge of Davis's career thus far has been defining such an integrative field. "Clinicians generally do not understand protein dynamics or behavior. This was apparent when I recently gave a talk to an audience of mostly clinicians. The take home message from one slide was to illustrate that proteins are dynamic and have movement, which are intermediate states that we need to appreciate because genetic variants can affect this 'normal' behavior. Within the slide was a short clip showing the dynamics of protein movement, so it was a protein flopping around C-terminal end," he explains. "One clinician, whom I admire, asked if I could stop the clip from playing because it was distracting. I thought it was funny but highlighted some of the differences across the fields. This made me really analyze how people outside of structural biology and biophysics interpret protein structures. I now try to emphasize the fundamentals so they can truly appreciate the biophysics. The availability of drugs to bind to their known target (which are largely proteins) depends on the ability of the protein to move and adjust to make that binding site accessible."

Outside of the scientific community, Davis expresses a great admiration for activists *Alicia Garza*, *Opal Tometi*, and *Patrisse Cullors*. "These phenomenal people are the founders of the international activist movement Black Lives Matter. There is scientific evidence that black Americans are systematically disenfranchised throughout society, in education, the workplace, by law enforcement, and in the justice system. Black Lives Matter campaigns against violence and systematic racism toward black people," he explains. "One of the most important questions to address is, why is there a need to state that Black Lives Matter? I admire these women because they have established an intervention to this systematic disenfranchisement based on scientific evidence."

> "Sometimes as students we get a little discouraged, and he has an uncanny way of reminding us why we started and why science is so exciting" — **Deneshia McIntosh**

The most rewarding aspect of the work for Davis is the opportunity to meet smart and creative people: students, faculty, and people in the community. One such person is *Deneshia McIntosh*, an MD-PhD candidate at Meharry who Davis has mentored following the passing of her thesis mentor last year. "Dr. Davis is the kind of colleague that most students are looking to interact with," McIntosh shares. "He has a way of making people excited about science. Sometimes as students we get a little discouraged, and he has an uncanny way of reminding us why we started and why science is so exciting. He constantly reminds me that I am a scientist and that I am more than capable of thinking on my own."

Davis encourages students and young scientists to think outside the box. "I am amazed at some of the innovative thinkers within, as well as outside, my field."

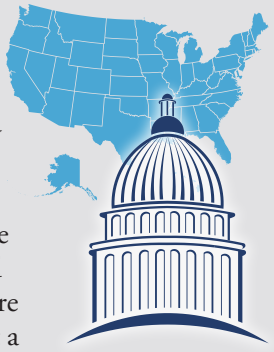
Profilee-at-a-Glance

Institution
Meharry Medical College

Area of Research
3D structures of protein complexes to understand disease phenotypes

Public Affairs

BE AN ADVOCATE in AUGUST: Meet with Your Members of Congress



Both the House and Senate traditionally break for a month every August. During this time, elected officials spend most of their time in their home states and districts. Because they are there for more than just a few days, it is great time to set up a meeting at his/her local district office or invite the representative or senator to tour your research lab. These meetings are a great way to make a connection and show your politicians the research taking place right there in their district.

Don't be intimidated! Congress members do want to meet and hear from their constituents. Plus, the Society is here to assist you in the process. Sign up to participate by July 21 and Society staff will guide you through the process, from setting up the meeting to providing materials you can use at http://www.biophysics.org/Policy/AdvocacyToolkit.

President's FY 2018 Budget Request

President *Donald Trump* submitted his budget request to Congress for Fiscal Year (FY) 2018 on May 22, 2017. The budget cuts $54 billion from nondefense discretionary funding in order to spend more on defense and stay within the sequestration caps set by Congress as part of the Budget Control Act of 2011. Proposed cuts to science agencies include a $6.6 billion (20%) cut for the National Institutes of Health (NIH), a $820 million (11%) cut for the National Science Foundation (NSF), a $919 million (17%) cut for the Department of Energy Office of Science (DOE). The Society has issued a statement and signed community congressional correspondence opposing the cuts. The Society has also asked its US members to contact their congressional delegations and ask them to oppose the cuts and fund science research.

At the NIH, the cuts would be made to indirect costs and the Fogarty International Center. Indirect costs provide grantee institutions with funds to cover costs associated with operating a research facility, such as building maintenance, utilities, and administrative support.

At the NSF, the number of graduate fellowships offered would be cut in half, and funding for the EPSCoR program would decrease from $160 million to $60 million. The purpose of the EPSCoR program is to make sure that states lacking large research universities still receive NSF funding. Additional savings came from budget decreases of around 7–10% to each research directorate.

At the DOE Office of Science, the budget proposal reduces funding for all programs but advanced computing. The innovation hubs focused on energy storage and artificial photosynthesis are completely eliminated, as is the EPSCoR program. Funding for the user facilities would also be cut back; the five synchrotron radiation light sources would have their budgets reduced 12.4% and the Nanoscale Science Research Center budget would be cut by 41.8%. The Biological and Environmental Research Office budget would be reduced from $314.7 million in FY 2016 to $123.6 million in FY 2018 and renamed Earth and Environmental Systems Sciences.

The budget is now in the hands of Congress. While the President can propose a budget, it is up to Congress to appropriate funds. The Society will keep members informed as the process progresses, and call on members to get involved when it is especially critical for senators and representatives to hear from their constituents.

NIH Announces Appointments of Johnson and Wolinetz

NIH Director *Francis Collins*, announced the appointment of *Alfred C. Johnson* as NIH Deputy Director for Management and *Carrie Wolinetz* as the Acting Chief of Staff for NIH. Johnson has been serving as the NIH Acting Deputy Director for Management since May 2016 and has been the Director of the NIH Office of Research Services since 2006. Wolinetz, would assume the role as Acting Chief of Staff for NIH. Wolinetz is also the Associate Director for Science Policy at the NIH.

Yasmeen Hussain to Serve as 2017–2018 BPS Congressional Fellow

(Continued from page 1)

Although she already has a few months in Washington working in science policy under her belt, Capitol Hill is a very different work environment than the National Academy of Sciences. Hussain is looking forward to being in the middle of the hustle and bustle that defines life on Capitol Hill, and in a position where she "can contribute in a meaningful way." Building on her work at the Academy, she is also looking forward to the challenge of having to develop expertise on a variety of issues quickly to help inform policymakers.

After a few weeks of training offered by the AAAS Science and Technology Fellowship program, in which the BPS Fellow is a participant, Hussain will work in a congressional office on legislative and policy areas requiring scientific input. She hopes to contribute her drive for problem solving, discerning eye for the evidence, and a fresh perspective on science policy issues to the office in which she ends up working. She also hopes that she is able to build collaborations and find bipartisan solutions. "As a researcher, I most enjoyed attending conferences — sharing ideas with others and coming up with creative solutions together. I see this experience as parallel to that; I'm excited to learn from my colleagues and synthesize our ideas into meaningful action!"

At the conclusion of her year-long fellowship, Hussain plans to pursue a career in science policy at either the federal or state level.

The Biophysical Society has offered the Congressional Fellowship since 2015 in recognition that public policy increasingly impacts scientific research, and basic science literacy is increasingly needed to develop responsible policy. Through the fellowship, the Society's leaders hope to provide a bridge between scientists and policymakers, and make sure that Congress has access to scientific expertise within its staff.

The AAAS Science and Technology Fellowship program, which is in its 44th year, brings almost 300 scientists to Washington, DC, to work both on Capitol Hill and in federal agencies, providing scientific expertise to policymakers while learning about the policy process. The BPS Fellow is part of this program, and has access to training, career development, and placement services, as well as a vast network of current and former program participants. Hussain has already tapped into this network, connecting with current and past fellows for advice on how to make the most of her fellowship year.

Biophysical Journal

Know the Editors

Catherine Galbraith
Oregon Health & Science University

Editor, Cell Biophysics

Catherine Galbraith

Q. What are you currently working on that excites you?

I am interested in how cells integrate the movement and interaction of millions of molecules into coherent and reproducible behaviors (isn't everyone?). How do all of those molecules sloshing around inside the cell get to the right place at the right time? Are there reproducible patterns in their movement or assembly? Can we span space and time scales to map these global molecular movements onto cellular behaviors and create a rulebook that can predict local cellular decisions? Answering these questions is what our lab does. We image and quantify the dynamic behavior of dense fields of molecules and map them onto signaling and or structural changes in cells. This lets us identify transient changes in molecular organization and interactions that give rise to cellular behaviors. We apply advanced imaging, including dense field single-molecule superresolution, biophysics, and computer vision analysis to "read the molecular tea leaves" and recently discovered that the local molecular dynamics of integrins forecast the decision to migrate in a specific direction. The questions we are currently working on include: What are the mechanisms that spatially target transport across the cell during cell shape change and migration? How do cells specify that adhesions only form at the leading edge, how does this specification direct migration, and how do differences in adhesive scaffold organization give rise to changes in mechanobiology that are indicative of disease progression?

Q. At a cocktail party of non-scientists, how would you explain what you do?

I tell people that I use microscopes to see individual molecules within cells, and that I take advantage of different mathematical and computer tools to figure out underlying patterns of molecules that are unique to a specific cell function or disease. I liken these patterns to cellular fingerprints that allow us to identify specific states of cell fate or disease progression. Once we are able to recognize these patterns, we can use any distinctive difference as an early indicator of disease or as a starting point for "smart" targets to design new therapies.

BJ Poster Award Winners

Congratulations to the students and postdocs listed below who won the BJ Poster Award competition at the recent BPS Thematic Meeting, Single-Cell Biophysics: Measurement, Modulation, and Modeling. These young investigators were selected from among 70 posters submitted to the competition during the meeting in Taipei, Taiwan. The winners receive a certificate and US$250.

Students

Ivan Alex Lazarte, Academia Sinica, Taipei, Taiwan
Quantifying Tight Junction Morphology of MDCK Epithelial Cells and Its Implications in Cell-Cell Interactions

Felix Wong, Harvard University, Cambridge, MA
Shape Recovery through Mechanical Strain-Sending in Escherichia coli

Postdocs

Wan-Chen Huang, Academia Sinica, Taipei, Taiwan
Dynamic Analysis of DNA and Topoisomerase II Interaction Based on Fluorescence Fluctuation and Single Molecule Detection

Daniel Jones, Uppsala University. Uppsala, Sweden
Kinetics of dCas9 Target Search in Escherichia coli

Members in the News

Congratulations to these BPS members for the awards and recognition reported here.

The following BPS members were elected to the National Academy of Sciences:

Yale Goldman, University of Pennsylvania and Society member since 1980.

Leemor Joshua-Tor, Cold Spring Harbor Laboratory and Howard Hughes Medical Institute and Society member since 2007.

The following BPS members received Sloan Fellowships:

Polly Fordyce, Stanford University and Society member since 2002.

Nikta Fakhri, Massachusetts Institute of Technology and Society member since 2001 (not pictured).

Randy Stockbridge, University of Michigan and Society member since 2016.

Yan Yu, Indiana University and Society member since 2010.

Carol V. Robinson, Oxford University and Society member since 2010, was named a Foreign Associate of the National Academy of Sciences.

Frances Separovic, University of Melbourne and Society member since 1985, was awarded the University of New South Wales Alumni Award for Science and Technology.

Jennifer Doudna, University of California, Berkeley and Society member since 2015, was awarded the BBVA Foundation Frontiers of Knowledge Award in the Biomedicine category, along with Emmanuelle Charpentier and Francisco Martínez Mojica, for their pioneering work with CRISPR/Cas 9 techniques.

Raghuveer Parthasarathy, University of Oregon and Society member since 2002, received the Kavli Microbiome Ideas Challenge.

BPS18
62ND Annual Meeting Biophysical Society
San Francisco, California
February 17–21, 2018

About the Program

We are honored and excited to present the program for the 2018 Annual Meeting. The program highlights the prominent position of biophysics as the cornerstone of biology, physics, and chemistry, and reinforces its importance in bridging basic scientific research with translational applications.

Symposia and Workshops cover a broad range of topics that represent the core strengths of the Society and also push the forefronts of biophysical theory, experiment, and technology. The sessions mix theoretical and experimental topics, in line with the interdisciplinary nature of our field. It is a wonderful time to be a biophysicist and we look forward to seeing you all in San Francisco.

2018 Program Co-Chairs

— *Anne Kenworthy*, Vanderbilt University School of Medicine

— *Francesca Marassi*, Sanford Burnham Prebys Medical Discovery Institute

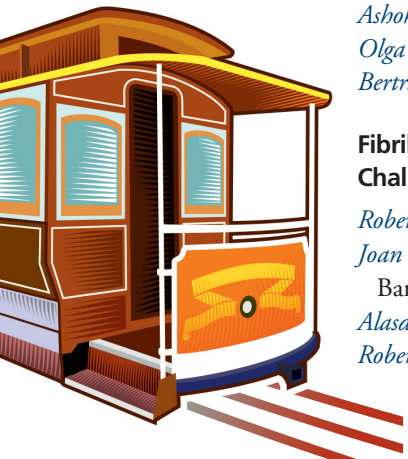
Symposia

Protein Folding Mechanisms

Susan Marqusee, University of California, Berkeley, Chair
Ashok Deniz, Scripps Research Institute
Olga Dudko, University of California, San Diego
Bertrand Garcia-Moreno, Johns Hopkins University

Fibril Assembly and Structure: Progress and Challenges

Robert Griffin, MIT, Co-Chair
Joan Emma Shea, University of California, Santa Barbara, Co-Chair
Alasdair Steven, NIH
Robert Tycko, NIH



Biophysical Mechanisms of Molecular Evolution

Michael Harms, University of Oregon, Co-Chair
Claus Wilke, University of Texas, Austin, Co-Chair
Tanja Kortemme, University of California, San Diego
Andreas Plückthun, University of Zürich, Switzerland

Protein Dynamics, Folding, and Allostery I: How Do Proteins Fold and Misfold?

Galia Debelouchina, Princeton University, Co-Chair
Michele Vendruscolo, University of Cambridge, United Kingdom, Co-Chair
Debora Marks, Harvard University
José Onuchic, Rice University

Protein Dynamics, Folding, and Allostery II: Dynamics and Function

Walter Chazin, Vanderbilt University, Co-Chair
Christina Redfield, University of Oxford, United Kingdom, Co-Chair
Judith Frydman, Stanford University
Tatyana Polenova, University of Delaware

Protein Structure and Dynamics in the Lipid Bilayer Membrane

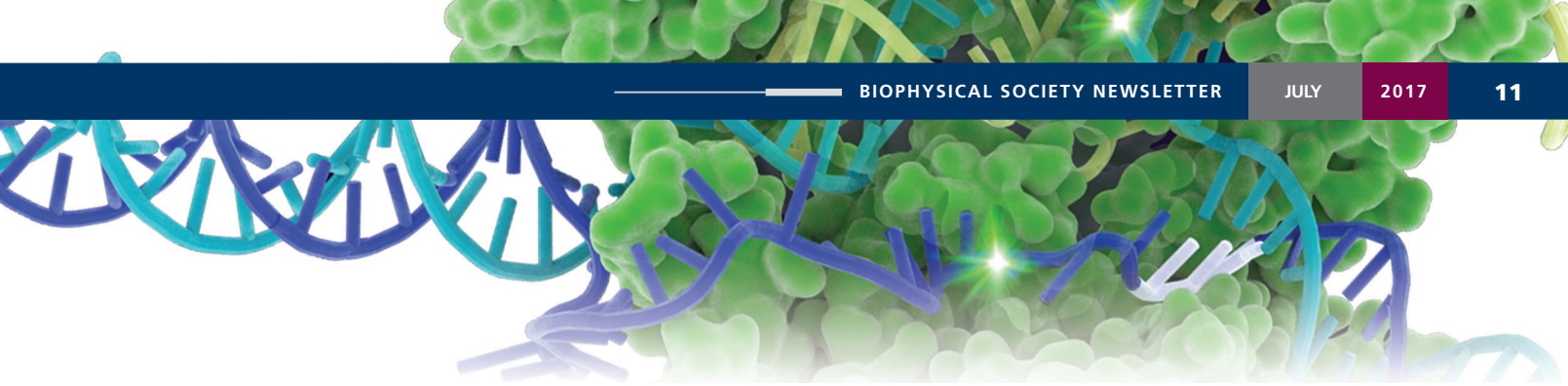
Timothy Cross, Florida State University, Co-Chair
Song-I Han, University of California, Santa Barbara, Co-Chair
Wonpil Im, Lehigh University
Nathaniel Traaseth, New York University

Transmembrane Signals and Signaling Mechanisms

William Cramer, Purdue University, Co-Chair
Lynmarie Thompson, University of Massachusetts, Amherst, Co-Chair
Vadim Cherezov, University of Southern California
Alexandra Newton, University of California, San Diego

Channel Mechanisms: Sensing and Gating

Teresa Giraldez, University of La Laguna, Spain, Co-Chair
Robert Stroud, University of California, San Francisco, Co-Chair
Paul Slesinger, Mount Sinai School of Medicine
Jacqueline Gulbis, Walter and Eliza Hall Institute, Australia



Membrane Bending: Mechanisms and Consequences

Jeanne Stachowiak, University of Texas, Austin, Co-Chair
Anne Ulrich, Karlsruhe Institute of Technology, Germany, Co-Chair
Andrew Callan-Jones, Université de Montpellier, France
Ralf Langen, University of Southern California

Interrogating Membrane Organization and Dynamics

Mary Kraft, University of Illinois, Co-Chair
Siewert-Jan Marrink, University of Groningen, The Netherlands, Co-Chair
Atul N. Parikh, University of California, Davis
Jennifer Lippincott-Schwartz, NIH, HHMI

Biophysics of Lipid-modified GTPases

Sharon Campbell, University of North Carolina, Co-Chair
Roland Winter, Technical University of Dortmund, Germany, Co-Chair
Jacqueline Cherfils, CNRS, France
John Hancock, University of Texas, Houston

Cardiac Contractility

Livia Hool, University of Western Australia, Co-Chair
Brian Sykes, University of Alberta, Canada, Co-Chair
David Thomas, University of Minnesota
Yael Yaniv, Technion Israel Institute of Technology

Cytoskeletal Motors

William Hancock, Pennsylvania State University, Co-Chair
Erika Holzbaur, University of Pennsylvania, Co-Chair
Anne Houdusse, Institut Curie, France
Steven M. Block, Stanford University

Modeling and Probing the Cytoskeleton

Anders Carlsson, Washington University, St. Louis, Co-Chair
Iva Tolić, University of Zagreb, Croatia, Co-Chair
Marileen Dogterom, Delft University of Technology, The Netherlands
Alexander Mogilner, New York University

DNA Supercoiling

Laura Finzi, Emory University, Co-Chair
Sarah Harris, University of Leeds, United Kingdom, Co-Chair
Nick Gilbert, University of Edinburgh, United Kingdom
David Levens, NIH

RNA Structure and Function

Teresa Carlomagno, Leibniz University of Hanover, Germany, Co-Chair
Karla M. Neugebauer, Yale University, Co-Chair
Maria Costa, Institut de Biologie Intégrative de la Cellule, France
Kiyoshi Nagai, University of Cambridge, United Kingdom

Energy Transduction

Susan Buchanan, NIH, Co-Chair
Krzysztof Palczewski, Case Western University, Co-Chair
Junko Yano, Lawrence Berkeley National Laboratory
Carola Hunte, University of Freiburg, Germany

Synaptic Vesicle Fusion and Retrieval

Axel Brunger, Stanford University, Co-Chair
Diasynou Fioravante, University of California, Davis, Co-Chair
Thomas Blanpied, University of Maryland
Ling-Gang Wu, NIH

Translational Biophysics

Melanie Cocco, University of California, Irvine, Co-Chair
Shankar Subramaniam, University of California, San Diego, Co-Chair
Donald Ingber, Harvard University
Shyni Varghese, Duke University

Biophysical Insights from Surface Engineering

Deborah Leckband, University of Illinois at Urbana-Champaign, Co-Chair
Kathleen Stebe, University of Pennsylvania, Co-Chair
Junsang Doh, Pohang University of Science and Technology, South Korea
Joseph Zasadzinski, University of Minnesota

Protein and RNA Phase Separation

Simon Alberti, Max Planck Institute, Germany, Co-Chair
Tanja Mittag, St. Jude Children's Research Hospital, Co-Chair
Clifford Brangwynne, Princeton University
Michael Rosen, University of Texas Southwestern Medical Center

International Affairs

Khaled Machaca

Research in a Region with Young Scientific Enterprise

The BPS Annual Meeting is one of my favorite meetings of the year, given the diversity and breadth of scientific topics. In these days of information overload, one rarely has the chance to carefully follow up on the literature outside the areas of our research focus, so a meeting such as this one provides an excellent venue to keep up with the latest in diverse areas that are directly and tangentially related to one's field of interest.

During this year's meeting, I had a break between two sessions and decided to use the few extra minutes to work on a grant application. I sat down next to a group of people also waiting, and could not help but to eavesdrop on the conversation next to me — it being considerably more fun than the grant I had been working on for a couple of weeks. The group of attendees next to me consisted of a theoretical physicist and two cryo-EM specialists in a pediatrics department. One can readily imagine the small talk that ensued among folks from very different scientific disciplines: "You guys are in the pediatrics department, are there enough clinical areas covered at the BPS meeting to make it interesting for you?"; "So, you're a theoretical physicist…, Why are you at a Biophysical Society meeting?" Interestingly enough though, after a few minutes of conversation the group found common scientific ground and ended up discussing lipid rafts and other membrane domains and how they affect protein and cellular function. One group was approaching the problem from a theoretical point of view while the other was trying to visualize the different domains using EM. Within a few minutes, scientists that at the outset had little in common found shared scientific ground of mutual interest.

I found this encounter to beautifully illustrate the power and uniqueness of the Biophysical Society —and the Annual Meeting in particular — to bring together scientists working in seemingly very different fields. In our current scientific environment, breakthrough discoveries are more likely at the interphase of different fields. This is because approaching complex scientific problems from different points of view, given one's expertise and training, increases the likelihood of novel ideas and approaches that have not been previously considered to resolve the issue at hand. Disparate points of view and expertise converge on resolving complex problems.

The BPS's diversity extends from its scientific scope to its membership, which has a significant international component with broad geographical reach. The BPS has been one of the pioneer scientific societies to formally extend its outreach through the thematic meetings in Asia and elsewhere. One could argue that the impact of the Society through both its membership and outreach activities is highest in countries with a young scientific enterprise. I have had firsthand experience on that front after moving from the United States to Qatar to establish a biomedical research program at the Weill Cornell Medicine campus in Doha. This was almost a decade ago, and we truly started that effort from the ground up. Contrary to the current situation, the research enterprise nationally in Qatar was practically nonexistent at the time. The leadership in Qatar had an exceptional vision driven by the Qatar Foundation to establish a research enterprise nationally, with the goal of driving the transition away from an economy built primarily on fossil fuels towards a knowledge-based economy.

Keeping that goal in mind, the Qater Foundation invited multiple US-based universities to establish branch campuses in Doha. The foundation supported a national funding agency, the Qatar National Research Fund (QNRF), and established a technology incubator, the Qatar Science and Technology Park. The vision was, and still is, to empower cutting-edge research within the university setting and create a venue for commercialization. The funding support from QNRF has been instrumental to drive the establishment of a

scientific enterprise in Doha. This infrastructure supported our efforts at Weill Cornell Medicine - Qatar (WCM-Q) to establish a biomedical research program. Through recruitment, training, and outreach activities, the research program at WCM-Q grew within five years to encompass over 32 active research labs, and over 200 staff including research specialists, postdoctoral fellows, and research associates. This was coupled with the establishment of eight core labs to support research activities as well as the establishment of a research administrative infrastructure, including grants and contracts, and regulatory oversight functionalities (IRB, IACUC, and IBC committees). The research cores include: genomics, proteomics, bioinformatics and metabolomics, imaging (microscopy, flow cytometery, and histology), miRNA, biostatistics, clinical research support, and a vivarium. Collectively, faculty at WCM-Q have published over 600 papers since 2010, and these publications have garnered over 4,000 citations in 2016 alone.

The establishment of the administrative and physical research infrastructure has been essential to our ability to conduct cutting-edge research; but interestingly enough, one of the most satisfying aspects of founding a functional and competitive research program has been the human aspect. The recruitment of a multi-national, culturally, and scientifically diverse group of scientists has been the cornerstone of the unique research program at WCM-Q. The majority of the research staff at WCM-Q has been recruited locally and trained in the latest research techniques. There is a significant untapped pool of talented young scientists who are eager to be involved in research. The raw interest in science by these young scientists goes beyond what I was used to in the United States. They exhibit a deep interest and desire to be involved in the scientific enterprise, which they perceive as a noble effort on its own right but also importantly as an effort that would move their country toward a more competitive position internationally in this age of connectivity and integration. Furthermore, because of the lack of local prospects to be engaged in research, these young scientists perceive such research opportunities as a privilege, which may partly explain the high level of commitment. Whether at the levels of WCM-Q students who join the medical program or research specialists who join the research effort, the transformation in maturity, scientific interest, and understanding that turns an initial curiosity about research into a career path is fascinating to witness.

The research program at WCM-Q offered the opportunity to many interested young scientists to be involved in biomedical research, who for cultural, personal, and/or financial reasons may otherwise not have had the chance to be engaged in science. The resident population in Qatar is significantly diverse and is composed from multiple nationalities both from the Middle East and North Africa as well as other regions of the world. As such it provides a good representation of the regional population. The talent pool among young graduates is exceptional, and importantly the interest in biomedical research is high. With the proper exposure, guidance, and training, Qatar and the region can harness this talent in a positive way to enhance home-grown research that is focused on problems and diseases of particular importance for the region. Our experience at WCM-Q has been quite constructive on that front. In the span of a few years, we have witnessed a change from fresh graduates in the sciences or more senior science graduates being engaged in odd jobs tangentially related to science if at all, now being involved in and contributing to cutting edge research. This is a much more effective use of their talent and intellect both at a personal level and nationally and regionally, as it increases local expertise and knowhow. Therefore outreach activities that reach these underserved regions, which I am sure many of our BPS members are involved in on a daily basis, bode well for the future in terms of engaging young scientists in research.

—*Khaled Machaca*

Publications

How to Write a Biophysics Article Worthy of Publication:

Part 3: From Submission to Acceptance

William O. Hancock
Pennsylvania State University

The first part of this series covered writing a first draft of a manuscript, and the second part covered the honing and polishing needed to bring the manuscript to the point where it is ready to submit to a journal. The topic of this final article is navigating the process of submitting, revising, and getting your manuscript accepted for publication.

Choosing a journal

Because this piece is written with the Biophysical Journal in mind, your manuscript has hopefully developed into an appropriate submission to that journal. From the journal website:

The mission of Biophysical Journal (BJ) is to publish the highest quality work that elucidates important biological, chemical, or physical mechanisms and provides quantitative insight into fundamental problems at the molecular, cellular, and systems, and whole-organism levels. Articles published in the Journal should be of general interest to quantitative biologists, regardless of their research specialty.

If your manuscript has evolved away from this definition, then you may want to choose another journal. A good guide is to consider what journals are commonly read by colleagues in your field and fields relevant to your work. Don't be overly swayed by impact factors, and avoid predatory journals. Consider the makeup of the Editorial Board who will be deciding on whether your manuscript is sent to review, and consider the business model of the journal. Society-based journals (such as Biophysical Journal) carry the weight of the Society, usually have a history, and are generally run by scientists for scientists.

Before submitting your manuscript (and during the process of writing drafts and polishing your figures), consult the Guide for Authors and follow formatting, word count, and figure guidelines. This will speed the submission and review of your manuscript, it increases the chance of acceptance, and it will save you time during later revision steps.

Most journals accept pre-submission inquiries to assess the suitability of the manuscript for the journal (and some journals require them). This process involves sending your title and abstract together with a short letter to the editor, and it saves time for everyone involved.

Navigating the review process

The process of submitting a manuscript involves a number of decision points that are shown in the figure at right. Upon initial submission, an editor will decide if the manuscript should be reviewed or be rejected (triaged) at this initial submission stage. Considerations include suitability of the topic for the journal, novelty of the work, completeness of the work, and perceived impact. Although it can be discouraging, this initial triage is another important time saver for everyone involved. Avoiding rejection at this juncture can be helped by a pre-submission inquiry to determine suitability, and by a convincing cover letter.

Cover letter

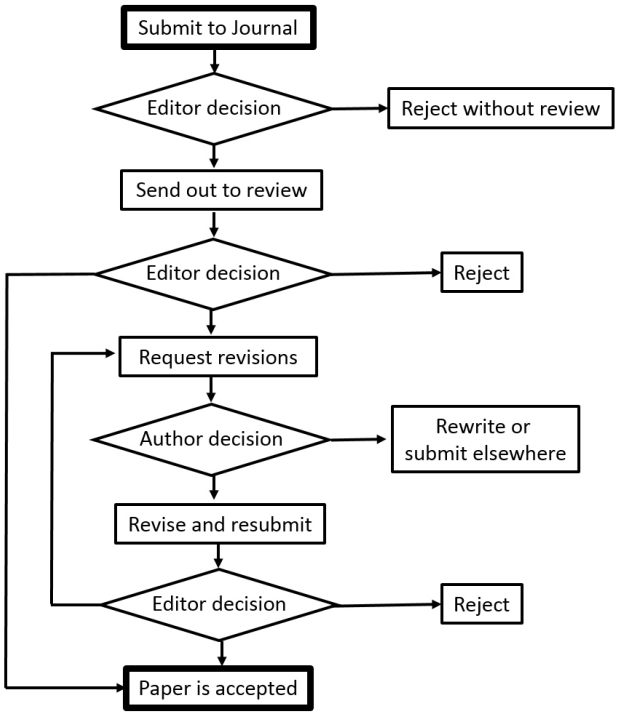
One element that is sometimes underappreciated by authors is the cover letter, which provides the author a platform to persuade the editor of the importance of the work and its suitability for the journal. The editor will generally be asking two questions: (1) Is this work significant? (2) Do the results justify the conclusions? In the letter, it is important to distill the key findings into a few sentences. However, more importantly, you want to place the work in the larger context of your field, and of the larger field of biophysics, cell biology, structural biology, or whatever your specialty may be. This larger perspective is what the editor is thinking about — what is the impact

of this manuscript, and will publishing it advance the mission of the journal? Therefore, it can help to point out important recently published work by yourself and others that relates to the manuscript. It is also good to remind the editor of the larger impact of the work on medicine, basic science, or technology. Some of this persuasion means plucking text from the Introduction or Discussion of the manuscript, but it also requires stepping out to more of a 30,000 foot perspective and persuading the editor in a way not unlike a grant application. Be specific and persuasive without being grandiose.

What makes an effective review?

Now that your manuscript has made it to peer review, it will be read by two or more reviewers who are considered experts in the subject of your manuscript. The primary goal of the reviewers is to ask: Do the results justify the conclusions? A good review should provide substantive feedback that enables the editor to make an informed decision on the manuscript and the authors to revise and improve the manuscript. Reviews generally begin with a brief summary of the findings and their relevance to the field, and may include the following:

- A critical evaluation of the experiments, highlighting any flaws in experimental design, questionable interpretation of data, and any internal consistencies.
- Highlighting previously published work (with references) that either contradict the work or may make the current experiments redundant.
- Reasonable requests for further experiments, particularly control experiments but also obvious (important) experiments that the authors may have neglected.
- Request for further analysis, reanalysis, or alternative presentation of experimental data, including adding or clarifying statistics.
- A critique of the text and figures highlighting areas of confusion, excessive verbosity, or flawed logic.



A good review will be civil, will avoid vague complaints, and will not harp unnecessarily on small details that may not be related to the principal point of the manuscript. The authors and editor are helped most by specificity and forthrightness in the evaluation of the manuscript.

Revising and responding to reviews

When the editor receives the reviews back, they then make a decision either to accept the manuscript as is (which is rare), reject the manuscript, or ask for major or minor revisions. At this point, the author has to make a decision. Rejections can be appealed in select cases, but this avenue should be used sparingly and should have strong justification. If the appeal is denied, then the authors should incorporate suggestions from reviewers before resubmitting to another journal, because it is likely that other reviewers will have the same complaints.

If minor revisions are requested, the authors can generally address the comments by editing the text, improving the figures, or making other modifications that don't take much time. In this case, the authors should attend to these tasks immediately and resubmit the revision. In the case of major re-

(Continued on next page.)

visions, the authors have other decisions to make. In some cases, the revisions and additional experiments requested are so extensive that it essentially requires rewriting the manuscript. Depending on constraints, the best avenue may be to make minor modifications and submit it to a more specialized or lower profile journal. If the decision is to revise and resubmit, then the authors must make a battle plan that involves some combination of further experiments, reanalysis of data, and revising the text and figures. Often a limit of 90 or 120 days for resubmission is given (though deadlines can usually be extended by a reasonable request); this timeline provides a scale of the amount of new work that is expected.

When resubmitting a manuscript, the authors should also submit both a marked copy that highlights changes, and a point-by-point response to the reviewer comments. It is expected that authors make a good faith effort to make edits and carry out further analysis and experiments. A letter that tries to simply rebut every suggested experiment will not generate good will with the editor or reviewers. That being said, it is reasonable to carry out some of the experiments suggested by reviewers and rebut suggested experiments that are onerous or extraneous. Editors and reviewers will be more inclined to accept an explanation for not doing an experiment if you have followed their directive on other suggested work. In some cases, data addressing a reviewer concern can be presented in the response to reviewers letter and not included in the text of the revised manuscript.

Upon resubmission, the editor may decide to accept the manuscript, or they may send it back out for review. At this point, the manuscript will be re-evaluated by one or more of the original reviewers. In some cases, a new reviewer may be added to address a particular aspect of the manuscript. If a major revision is requested and the authors have not carried out the requested experiments or sufficiently revised the work, the manuscript may be rejected at this point. If the revisions were extensive and the reviewers still have complaints, then the manuscript may be sent back to the author for another round of revisions. While this action is necessary in some cases, the extra work and time can be avoided by authors responding fully to critiques on their first revision and by reviewers detailing all of their concerns on their initial review and abstaining from making new critiques of aspects of the manuscript that were not commented on during the first round.

Helpful online resources

In addition to the references presented in Part 2 of this series, there are a number of more general resources online to help improve your scientific communication.

https://cgi.duke.edu/web/sciwriting/

- An excellent online writing resource with tutorials that focus on science writing fundamentals

http://www.nature.com/scitable/ebooks/english-communication-for-scientists-14053993/writing-scientific-papers-14239285

- Helpful eBook on writing scientific papers from Nature Education

http://www.ncbi.nlm.nih.gov/books/NBK988/

- A useful style guide, particularly for questions on grammar

http://www.americanscientist.org/issues/pub/the-science-of-scientific-writing

G. Gopen and *J. Swan*. The Science of Scientific Writing. American Scientist, November-December 1990.

- An in-depth article that focuses on the readers' perspective and breaks down sentence and paragraph structure for maximum communication

Books:

Michael Alley, The Craft of Scientific Writing, 3rd Edition, Springer, 1995.

Michael Jay Katz, From Research to Manuscript: A Guide to Scientific Writing. Springer Netherlands, 2009.

Publishing your paper

Hopefully this process will culminate with your manuscript being accepted for publication. Congratulations! But before you can move on to your next paper, there are a number of details to take care of. First, it is imperative that the final revision that was submitted is error free. It is worth taking the time now to be sure that the version that the journal has in hand has all figure numbers correct, all references in order, and other small details in place. This is also the last time you will be able to edit the Supplemental Information, so be sure that document is properly formatted and is complete. You will be sent page proofs for final checking, but it is best to have everything ironed out before the manuscript goes to proof stage, so that the final stage only involves checking for typesetting errors, figure placement, and related small details.

Over this three-part series, we have gone from data in a lab notebook to a published paper. This process takes a lot of work, and although it gets easier the more you do it, publishing a paper is always a considerable effort. However, peer-reviewed publications are the currency of science, and so the effort is necessary and worth it, and reaching this milestone is cause for celebration. And, after the celebration dies down, then get back to the lab and do it again…

Acknowledgements

The author thanks *Beth Staehle* for assistance and advice, *Olaf Anderson* for many of the ideas that went into this work, and members of the Biophysical Society Publications Committee for many helpful suggestions. He also thanks his mentors *Joe Howard* and *Al Gordon*, as well as his 8th grade grammar teacher, *Jim Ernst*, for teaching him how to write. W.O.H. is supported by the NIGMS.

Grants and Opportunities

NIH Director's Transformative Research Awards (R01)

Objective: This award complements NIH's other grant programs by supporting an individual scientist or group of scientists proposing groundbreaking, exceptionally innovative, original and/or unconventional research with the potential to create new scientific paradigms, establish entirely new and improved clinical approaches, or develop transformative technologies. Little or no preliminary data is expected.

Deadline: September 15, 2017

Website: https://grants.nih.gov/grants/guide/rfa-files/RFA-RM-17-007.html

NSF-Simons Research Centers for Mathematics of Complex Biological Systems (MathBioSys)

Objective: This program is to enable innovative collaborative research at the intersection of mathematics, and molecular, cellular, and organismal biology, to establish new connections between these two disciplines, and to promote interdisciplinary education and workforce training. Up to three new research centers will be sponsored to facilitate collaborations among groups of mathematicians, statisticians, and biologists.

Deadline: Letter of Intent due date: August 10, 2017; Full Proposal Deadline: September 29, 2017

Website: https://www.nsf.gov/pubs/2017/nsf17560/nsf17560.htm

Molly Cule

Molly Cule
Advice

How Do You Tailor your CV or Resume to Industry Jobs?

If you are thinking about applying for jobs outside academia, but aren't sure where to begin, you're not alone. In today's economic climate and with the ever-changing career landscape, an increasing number of graduate students and postdocs are electing to look for careers outside the ivory tower. The key is to find work to which you are both interested and suited.

In order to get ready, let's look at the differences between resumes and CVs to help you think about your transition and how to apply for your new job.

Resumes and CVs are not interchangeable. Not only are their structure, content, length, and styles completely different, but to be more specific, a resume is much more concise. It's basically a one-to-two page document. A CV is static and doesn't change for the various positions you are applying for, whereas a resume is intended to make an individual stand out and does change for various positions.

Your resume should convey how your past experiences relate to where you are going. This is another key difference between a CV and a resume. A CV, as mentioned above, does not change for the different applications you are writing; it is intended to focus on where you have been, a list of your past experiences. A resume is different in this sense; it should also convey where you are going. It should be a selection of your past experiences that are best suited for the job to which you are applying.

Next, let's look at the parts of the resume itself.

There are certain parts of your resume that will resemble your CV, such as your name and contact information, but other parts of your resume will be different, such as the objective statement. This is a one sentence statement focused on what you are looking for in a job. This statement should change based on the job and type of position you are applying for, but fundamentally it is used to show that you are well-suited for the position.

Next is your qualifications and skills summary and it should focus on past positions that best prepare you for (or best align with) the job you are applying for. Omit any statements that aren't important for the position's goals, and focus your statements to make them relevant to the position. Don't forget to emphasize your matching skills to what the employer wants in an ideal candidate!

Following your listed qualifications is your employment history. This is another section that should be tailored to the job for which you are applying. Review the job description and focus on your job experience and achievements that relate to the opening (but of course this should be an honest account!). Put any key qualifications at the top of your description and make them stand out.

Lastly, don't forget to customize your resume to each job for the best results. Good luck!

By the Numbers

According to the National Science Foundation, 3,260 doctorate degrees have been awarded in biophysics between 2005 and 2015 in the United States.

Source: https://www.nsf.gov/statistics/2017/nsf17306/datatables/tab-13.htm

From the BPS Blog

http://biophysicalsociety.wordpress.com

Biophysicists Finding Balance: Mother's Day 2017

May 14 was Mother's Day in the United States. In honor of the occasion, BPS members *Eva-Maria Collins*, University of California San Diego, and *Sarah Veatch*, University of Michigan, shared their experiences of being both a biophysicist and a parent, and how the two roles impact each other. https://biophysicalsociety.wordpress.com/2017/05/12/biophysicists-finding-balance-mothers-day-2017/.

Advocating for Science on Capitol Hill: a Scientist's Perspective

BPS member *Christy Gaines*, University of Maryland Baltimore County, traveled to Capitol Hill this April to attend STEM on the Hill Day with the Biophysical Society. She writes on the BPS blog about visiting her representatives' offices and advocating for sustainable, predictable, and robust funding for science. https://biophysicalsociety.wordpress.com/2017/05/23/advocating-for-science-on-capitol-hill-a-scientists-perspective/.

Student Center

Tien Comlekoglu

Tien Comlekoglu
Department of Biomedical Engineering
Virginia Commonwealth University

Q: What has been your favorite course while studying biophysics? Why?

My favorite course was called Introductory Quantitative Physiology as it was my first exposure to the field of biophysics and physiology. This course provided me with the knowledge needed to start understanding scientific literature and led me to seek out undergraduate research in physiology.

Calling All Students

Want to be featured in Student Center? Answer the question: As a student of biophysics, what has been your favorite course and why? Send a photo and your answer to bstaehle@biophysics.org.

Correction

In the May issue of the Newsletter, the obituary for William Knox Chandler contained an error. The second to last sentence should have read as follows:

They found that, during a typical spark in a frog twitch fiber under physiological conditions, about 20,000 calcium ions are released in about 4 ms, probably from 2-4 active channels (16°C).

Connect with BPS

Subgroups

New Cell Biophysics Subgroup Petition Circulating

Following the BPS Thematic Meeting held in Taiwan this past month, several Society members, including *Jie Xiao*, *Jung-chi Liao*, *Antoine van Oijen*, *Julie Biteen*, and *David Rueda*, have begun soliciting signatures for a petition to start a new Cell Biophysics Subgroup. Current Biophysical Society members who are interested in signing a petition supporting the formation of this subgroup may send their affirmation of support to subgroup@biophysics.org

The Cell Biophysics Subgroup aims to bring biophysical studies into cells to probe structures, functions, dynamics and interactions of macromolecules in their own physiological context. A living cell is a complex entity; the heterogeneous cellular environment is drastically different from the homogenous, well-mixed situation in vitro. Recent technical advances have made it possible to probe the inner working of cells with unprecedented resolution, sensitivity, and specificity; new experimental and computational studies have provided invaluable, quantitative understandings of cellular processes. The subgroup will provide a much-needed platform for researchers to share scientific ideas, discuss research results, forge new collaborations, and together, to push the frontiers of knowledge in cell biophysics.

Bioenergetics

We had a great group of talks in the Bioenergetics Symposia on Subgroup Saturday February 11, 2017. Throughout the day, approximately 100 people were in attendance for the talks. We appreciate the sponsorship of Agilent Technology, Anatrace, Aurora Scientific, Avanti Polar Lipids, Bio-sight, Cayman Chemicals, Cairn Research, and Morrell/Nikon.

The first symposium, "High Resolution Structure, Function, and Dynamics of Mitochondrial Proteins," was co-chaired by *Nelli Mnatsakanyan* and *Shelagh Ferguson-Miller*. *Diego Gonzalez-Halphen* spoke about his work defining the unique structure of ATP synthase dimers on Chlorophycean mitochondria. *Ulrich Brandt* then talked about structure–function correlations of complex I. *Karin Busch* described her work using high-resolution imaging to examine movement of ATP synthase in the inner mitochondrial membrane. *Maria Sola* talked about the unique structure of Twinkle DNA helicase. *Edmund Kunji* described structure–function relationships in mitochondrial carriers such as ANT. Finally, *James Chou* spoke about the selectivity filter of MCU.

The afternoon symposium, "Mitochondrial Redox Regulation in Health and Disease," was co-chaired by *Pablo Peixoto* and *Michelangelo Campanella*. First, *Valerian Kagan* described the vast complexity of lipid and cardiolipin signaling. Then, *Paul Brookes* talked about the importance of complex I and II, reverse electron transport, and metabolic signaling during ischemia. *Antoni Barrientos* spoke about the complex assembly patterns of complex 4. Finally, *Anatoly Starkov* discussed the difficulties of studying ROS production.

On Monday afternoon, the BPS symposium "Mitochondrial Dynamics and Transport" was well received. *Robert Balaban* described his work defining the structure of the mitochondrial reticulum in skeletal muscle. *David Chan* talked about his work examining the control of mitochondrial fission and fusion. *Karen Davies* spoke about her investigation into the structure of ETC complexes and supercomplexes in situ. Finally, *Elizabeth Jonas* gave a comprehensive summary of the work she has done on mitochondrial control of synaptic physiology and plasticity.

There were two well-attended bioenergetics poster sessions: "Mitochondria in Cell Life and Death" I and II.

Finally, we awarded the Young Bioenergeticist Award to *Melanie Paillard*, who gave a short presentation of her work between symposia on Subgroup Saturday. *Danilo Faccenda* was given an

honorable mention. Finally, after three presentations by worthy trainees, the Student Research Achievement Award was awarded to *Divakaran Murugesapi*, Northeastern University, for his poster Mitochondrial Protein ABF2P Intercalates, Bends, Loops, and Compacts DNA.

—*Elizabeth Jonas*, Co-Chair, Bioenergetics Subgroup
—*George Porter*, Co-Chair, Bioenergetics Subgroup

Exocytosis & Endocytosis

The Exocytosis & Endocytosis Subgroup had a great meeting this year organized by *Brian Salzberg*, University of Pennsylvania.

The meeting started with three student talks by *Alex Kreutzberger*, University of Virginia; *Joannalyn Delacruz*, Cornell University; and *Natasha Dudzinski*, Yale University. These were selected from the several dozen poster submissions by student members in the subgroup. Excellent presentations followed by *José Lemos,* University of Massachusetts; *Erwin Neher*, Max Planck Institute for Biophysical Chemistry; *Amy Lee*, University of Iowa; *Xuelin Lou*, University of Wisconsin; followed by the Katz Award Lecture, *The Long Road to Micro-Dynamic Presynatpic FRET Measurements*, given by *Robert Zucker*, University of California, Berkeley. Zucker was selected for the Katz award for his extensive studies on the mechanisms of transmitter release and short-term synaptic plasticity. He has developed novel methods for measuring intracellular calcium concentrations using aequorin and arsenazo III and used them to provide the first measurement of residual calcium during synaptic facilitation in the squid giant synapse. In the several decades that followed, he has continued to explore the calcium regulation of voltage-activated ion channels, neuronal growth, long-term depression at the NMJ, and depolarization-induced suppression of inhibition. The bulk of his effort has been devoted to quantifying the role of calcium in exocytosis at a variety of synapses. The previous five Katz award winners were *Sandra Schmid* (2016), *Ronald Holz* (2015), *Axel Brunger* (2014), *James Rothman* (2013), and *Pietro De Camilli* (2012).

We thank *Brian Salzberg* for a great meeting and look forward to an exciting meeting next year in San Francisco on Saturday, February 17, 2018. Mark your calendars!

—*Dixon J. Woodbury*, Chair, Exocytosis & Endocytosis Subgroup

Membrane Biophysics

The 2017 Membrane Biophysics Subgroup symposium was held at the Annual Biophysical Society Meeting in New Orleans, February 11, 2017. The symposium on sensors was chaired by *Teresa Giráldez*, University of La Laguna, Spain. The membrane is the frontier between the cell interior and the outside world, and many membrane proteins act as sensors of internal and external signals, including light, temperature, stretch, voltage, pH, or intracellular signaling molecules. The session featured some of the most innovative investigators in this area, who presented state-of-the-art research on the fundamental biophysical properties of such sensors, at the molecular level, as well as their impact on cellular processes, in a physiological context. *Peter Hegemann*, Humbolt University, Germany, led off the program with his outstanding work on the molecular mechanisms

of light sensing by rhodopsins, also showing how this knowledge has been translated into engineered channels that allow for the manipulation of membrane excitability. *I. Scott Ramsey*, Virginia Commonwealth University, presented new insights into how the Hv1 channel, which lacks a conventional voltage sensor domain, nevertheless senses membrane voltage to control proton permeation. Interesting new data on the biophysics of temperature sensing by TRP channels was shown by *Sebastian Brauchi*, Universidad Austral, Chile, followed by *Andrea Meredith*, University of Maryland, who gave an integrated view of the biophysical mechanisms contributing to circadian regulation of membrane excitability by Ca2+ sensors.

During the coffee break and business meeting, we elected our new treasurer, *Matthew Trudeau*, University of Maryland, and the 2019 chair, *Andrew Plested*, Leibniz Research Institute for Molecular Pharmacology (FMP), Germany.

The symposium continued with *Stephen Tucker*, Oxford University, United Kingdom, who presented new structural insights on mechanosensing mechanisms of TREK-2 channels. The biophysical mechanisms underlying sensing of membrane stretch by mechanosensitive channels was further addressed by *Miriam Goodman*, Stanford University. Lastly, *Thomas Hughes*, Montana Molecular, presented an incredible array of molecular biosensors as useful biophysical tools to study physiological processes occurring at biological membranes.

The symposium was followed by the annual Cole Award ceremony and dinner, which honored this year's awardee, *Kenton J. Swartz*, National Institutes of Health. His longstanding efforts to elucidate the mechanisms of voltage sensing by potassium channels, as well as the effects of protein toxins thereon, have been critical to advancing our understanding of these important systems; similarly, his more recent work on P2X receptor and TRP channels constitute seminal contributions to those fields that pave the way to a more profound understanding of structure-function relationships for these two classes of proteins. The presentation reviewed his career and professional accomplishments, highlighting the role of his many trainees and co-workers.

More than 200 people attended the subgroup meeting and the Cole Award dinner. Subgroup members are very grateful for the support of various sponsors : Society of General Physiologists, Nature America, Elsevier-Journal of Molecular Biology, Genentech Inc, Elements SRL, Harvard Bioscience Inc, Sutter Instrument, Pfizer, Nanion Techologies.

The next symposium of the Membrane Biophysics Subgroup, "Dissecting the Thermodynamics of Channels and Transporters through the Unholy Matrimony of Experiment and Computation," will take place during the 2018 Annual Biophysical Society Meeting in San Francisco, and will be chaired by *José D. Faraldo-Gómez*, National Institutes of Health.

—*Teresa Giráldez*, Chair, Membrane Biophysics Subgroup

Science Fairs

This year BPS funded 43 awards at regional and state level science fairs in 20 US states — more than in any other year — raising the total number of awards to over 200 since this program began in 2009. These awards are given for outstanding biophysics-related projects by high school students. Society members volunteered to be judges for fairs near them, and BPS hopes to have even more judges next year! Science fairs are a great opportunity for students who are interested in science to interact with biophysicists. This initiative, sponsored by the Public Affairs Committee, encourages the teaching and learning of STEM subjects, and raises awareness of biophysics among high school students and teachers.

One of the awardees, *Erika Yang*, sent an email to thank BPS for the award. She said, in part,

"I am so incredibly grateful to have won this award and this opportunity. It also greatly encourages me to further my path as a scientist in this world and make a lasting contribution. For the past couple of years, I have been working on my science project of developing a flexible MoS2 biosensor in order to detect lower concentrated areas of biological molecules. This research is specifically targeted towards cancerous cells… Again, thanks to Biophysical Society for selecting me for the Biophysics Award and supporting me in my efforts."

Another awardee, *Shiker Nair*, wrote to thank the Society for the award, saying that he plans to use the funds to continue his research. Three Biophysics Award winners were also selected by their fairs to represent their area at the Intel International Science and Engineering Fair. Two of those students went on to win Special Awards at this international competition, which is the largest pre-college scientific research event in the world.

The judges enjoyed the time they spent volunteering. *Viksita Vijayvergia*, pictured, wrote that she enjoyed going to the science fair and seeing the progress of young minds, calling it a "remarkable experience."

From left to right: Judge Kyle McClary, awardee Rohan Mehrotra, and judge Viksita Vijayvergiya. They are pictured with Rohan's project "Novel Nanoscale Approach to Combat Disease: Electrically Stimulated Drug Release from Biodegradable PCL Nanofilms."

Thank you to the Society members who volunteered to judge at their local science fairs this year! Didn't get a chance to volunteer? More information will be online this fall about the 2018 science fair season at www.biophysics.org/AboutUs/GetInvolved/ScienceFairs/. Questions? Email scifairs@biophysics.org.

Biophysical Society

5515 Security Lane, Suite 1110
Rockville, Maryland 20852

We've Moved!

New Address Above

UPCOMING EVENTS

August

August 8–9

Cardiovascular Research: Refined Technologies for Investigation of Tissue-Derived Cardiovascular Cells
Cologne, Germany
http://www.miltenyibiotec.com/en/support/macs-academy/sessiondetails.aspx?semid=320

August 16–19

First Conference on Biomotors, Virus Assembly, and Nanobiotechnology Applications
Columbus, OH
https://rnanano.osu.edu/Guo/Biomotor2017/Biomotor2017.html

September

September 23–24

Multiscale Theory and Computation
Minneapolis, MN
https://math.umn.edu/events/multiscale-theory-and-computation

September 27–28

Cell Therapy and Molecular Medicine
Chicago, IL
http://celltherapysummit.conferenceseries.com/

October

October 16–17

5th World Congress on Bacteriology
Rome, Italy
http://bacteriologycongress.alliedacademies.com/

October 22–24

CRISPR: From Biology to Technology and Novel Therapeutics
Sitges, Spain
http://cell-symposia.com/crispr-2017/

November

November 8–10

Cell Biology of Viral Infections — The Ins and Outs of Virus Infection: From Binding to Exit
Schöntal, Germany
http://www.gfv-cellviro.de/

November 14–16

9th Symposium on Continuous Flow Reactor Technology for Industrial Applications
Barcelona, Spain
http://www.flowchemistrytks.com/9th-edition.html

Please visit www.biophysics.org for a complete list of upcoming events.